Analysis of Disease Structure for the Regional Health Care Plan Based on the National Database

Shinya Matsuda[1] and Kenji Fujimori[2]

[1]*Department of Preventive Medicine and Community Health, School of Medicine, University of Occupation-al and Environmental Health, Japan*

[2]*Community Care Support Center, Hokkaido University Hospital*

Abstract:

In Japan, Regional Health Care Plan (RHCP) is established every 5 years that defines health care region, regulates the health resources and intends to coordinate the health services. It requires the concrete data for actual and future situation. In order to ameliorate the quality of RHCP, we have tried to describe the actual situation of health service delivery for cerebral infarction in Fukuoka prefecture, based on the nationally accumulated claim database, so called National Database (NDB).

For this analysis, we have used the one month data (October, 2010) of Fukuoka prefecture. This dataset contains the about 1,500,000 claim data. The ID number was hashed twice in order to make it anonymous. Using this dataset, we have conducted in- and out-flow analyses of the cerebral infarction patients for each of 13 HCRs of Fukuoka.

In the case of acute in-patient care, six HCRs (Fukuoka-Itoshima, Nogata-Kurate, Kitakyushu, Chikushi, Yame-Chikugo and Ariake) showed more than 80% self-completion rate, that is, more than 80% of patient who live in these areas receive the acute in-hospital services at the hospital of their residential areas. On the other hand, sub-acute care beds were in shortage in some HCR such as Iizuka.

The present study has clarified the usefulness of NDB for describing the disease structure of each HCR. Using this kind of information, policy makers can formulate a more practical health care plan.

Key words: Claim data, Health care planning, Health care region, Japan

❖Introduction

Facing to the highly aged society, Japan is required to reorganize its health care delivery system. The 2008 Health Reform Plan of Ministry of Health, Labour and Welfare (MHLW) clearly pronounced its will to clarify the function of each medical facility and to re-organize the health care system. However, as the Japanese health system heavily depends on the private sector and permits a large freedom for the care providers for choice of specialty and place of work, it is not so easy for MHLW to advance the reform. One of the most important political tools for this purpose is the Regional Health Care

Plan (RHCP). The Health Care Law requires for each prefectural government to establish RHCP every 5 years. The RHCP defines the Health Care Region (HCR) and regulates the number of beds for each HCR. In the case of Fukuoka prefecture, there are 13 HCRs as shown in Figure 1. If there are more beds that the corresponding HCR defines, it is not possible to construct more beds in the region. It is evaluated that the bed regulation by RHCP might control the increase of in-hospital services. Furthermore, RHCP requires to precise the programs for coordination and functional differentiation among the hospitals.

However, for most of the cases, the programs for coordination and functional differentiation are not written in a way that materializes the objectives[1)-5)]. There might be an emotional hierarchy of hospital functions among the health care providers, that is, acute care hospitals have a higher value than non-acute care hospitals. Thus, many hospitals compete for providing the acute

Figure 1   Health Care Regions (HCRs) of Fukuoka Prefecture

in-hospital care beyond the needs of population. The ageing of society and advance in medical technology has caused a drastic change of disease structures from acute to chronic diseases/conditions dominant pattern. This requires health care providers to change their clinical function in order to adapt to this change. However, most of them seem to hesitate because of shortage of concrete information.

In fact, it is the most important role of RHCP to indicate the actual and future health care needs of the region with a set of concrete information. In 2008, MHLW has started to gather all health care insurance claim data and to construct a database, so called National Database[6]. The authors have been permitted to use this database as a pilot study of its use for RHCP. In this article, we will explain its results.

❖Materials and method

For this analysis, we have used the one month data (October, 2010) of Fukuoka prefecture. This dataset contains the claim data of national health insurance [Note 1], health insurance for the aged [Note 2] and social aid [Note 3]. Total number of claims was about 1,500,000. The ID number was hashed twice in order to make it anony-

mous. In order to increase the information security level, age was categorized for each 5 years and insures number was re-coded into the Health Care Region (HCR) number. The diagnosis coded by ICD was re-coded as DPC number (i.e., I63.0 to I63.9 as 010060; Cerebral infarction). In this way it became impossible to identify a particular individual.

Using this dataset, we have conducted in- and out-flow analyses of the patients for each diagnosis (represented by base DPC [Note 4]) for each of 13 HCRs of Fukuoka (Figure 1).

In order to assure the information security, the results of in- and out-flow analyses were presented by percentage basis. Study approval was obtained from the Institutional Review Boards and the Ethics Committee of the University of Occupational and Environmental Health. Given the anonymous nature of the data collection process, informed consent was not required.

❖Results

Figure 2 to Figure 5 show the results of in- and out-flow analyses of the patients for the base DPC 010060 (cerebral infarction) stratified by acute in-hospital, post-acute (rehabilitation) in-hospital, long term in-hos-
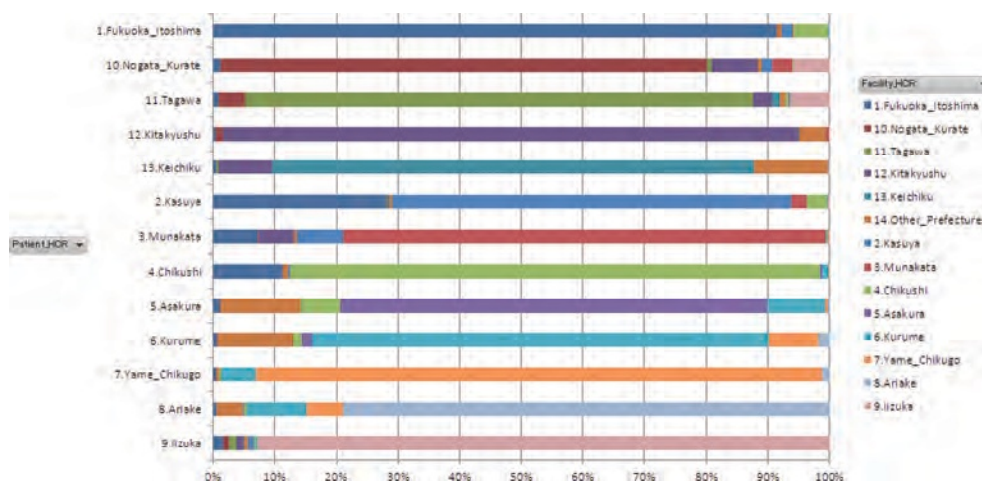
Figure 2   Self-completion rate of acute in-patient care for cerebral infarction
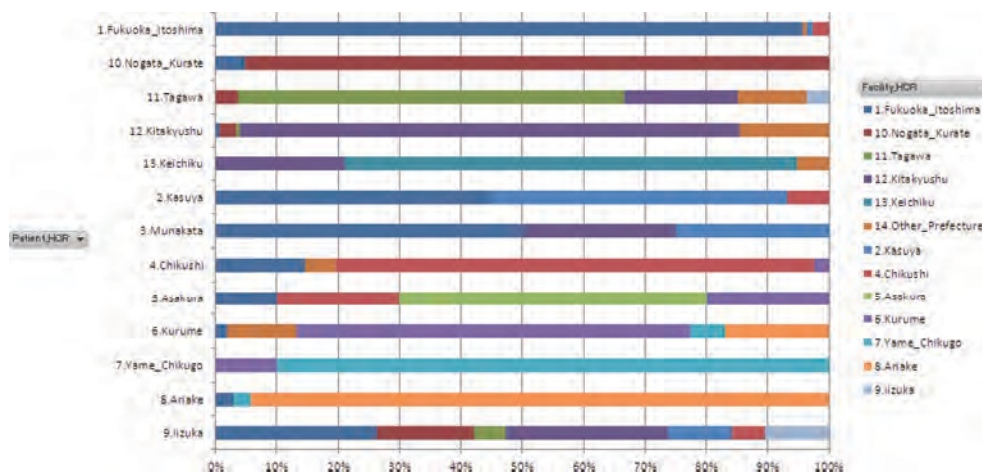(October2011, Fukuoka Prefecture)

Figure 3   Self-completion rate of subacute in-patient care for cerebral infarction
(October2011, Fukuoka Prefecture)

pital and out-patient care.

In the case of acute in-patient care, six HCRs (Fukuoka-Itoshima, Nogata-Kurate, Kitakyushu, Chikushi, Yame-Chikugo and Ariake) showed more than 80% self-completion rate (Figure 2), that is, more than 80% of patient who live in these areas receive the acute in-hospital services at the hospital of their residential areas.

For post-acute in-patient care, six HCRs (Fukuoka-Itoshima, Tagawa, Kitakyushu, Chikushi, Yame-Chikugo and Ariake) showed more than 80% self-completion rate (Figure 3).

For long term in-patient care, seven HCRs (Fukuoka-Itoshima, Kitakyushu, Keichiku, Munakata, Yame-Chikugo, Ariake and Iizuka) showed more than 80% self-completion rate (Figure 4).

For out-patient care, seven HCRs (Fukuoka-Itoshi-

ma, Nogata-Kurate, Tagawa, Kitakyushu, Chikushi, Yame-Chikugo and Iizuka) showed more than 80% self-completion rate (Figure 5).

Table 1 showed two examples of community care indicators that are easily calculated by claim data; collaboration rate and home care rate. The formulas are as shown in Table 1. Although MHLW has introduced a special tariff for collaboration of stroke care among the different facilities, the rate is relatively law and showed a wide variation; 0% for Munakata and Keichiku to 6.6% for Yame-chikugo. Home care rate also showed relatively law rate and wide variation; 1.8% for Yama-Chikugo to 7.4% for Keichiku area.

❖Discussion

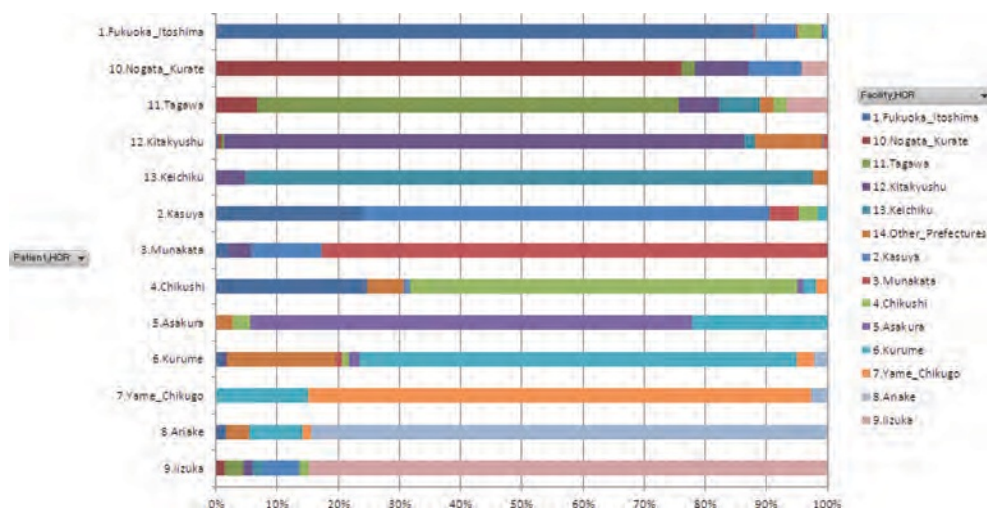There are several limitations for this analysis. First,

Figure 4   Self-completion rate of long term in-patient care for cerebral infarction
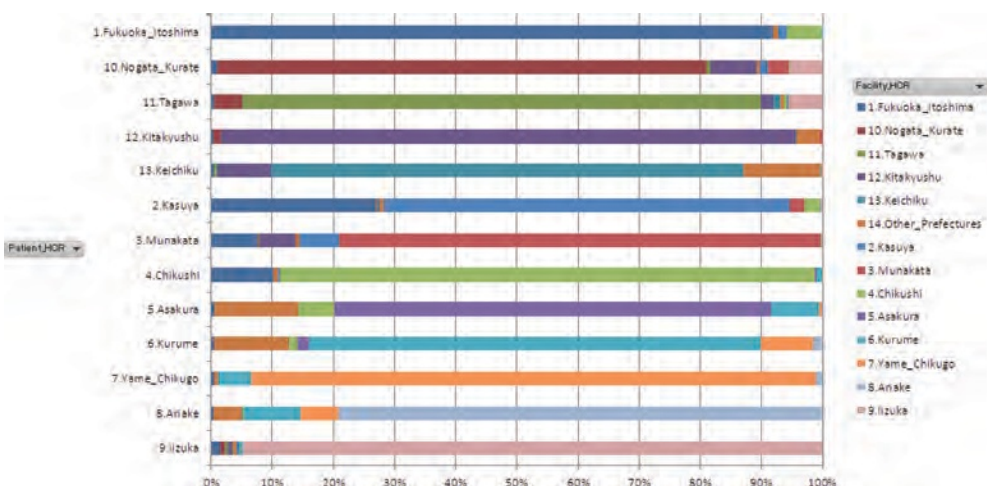(October2011, Fukuoka Prefecture)

Figure 5   Self-completion rate of out-patient care for cerebral infarction (October2011,
Fukuoka Prefecture)

for the current analysis, we used the claim data of national health insurance, health insurance for the aged and social aid because the identification of residential HCR of patients are possible only for these three schemes. That is, the claim data of corporate-managed health insurance was not included. So there might be a problem of selection bias. Second, as the studied period is only one month, there would be a bias caused by seasonal influence. Third, multi-morbidity was not considered in the analysis. This might alter the real impact of particular diseases such as dementia; because this pathology is tend to be coded as accompanied diagnosis. Keeping these limitations in mind, we would like to discuss about the usability of claim data for health policy in the following parts.

As our previous study indicated for cancer[1], the

present study has also clarified the usefulness of NDB for describing the disease structure of each HCR. Using this kind of information, policy makers can formulate a more practical health care plan. In fact, a series of former RHCP were not always evidence based. They have described an ideal model without any concrete data and indicators. Using NDB, we can measure the gap between the actual situation and the goal. This makes it possible to establish a rational RHCP based on the Plan – Do – Check – Action cycle as Ogata indicated[4].

For example, Figure 2 to 5 have clarified that the Iizuka HCR is shortage of post-acute care in-hospital beds. This makes it impossible for the stroke patient to receive a comprehensive care within his/her residential area. The data has indicated that additional 20 post-acute care beds might make it possible to realize an ide-

Table 1   Examples of Community health indicators for cerebral infarction (October2011, Fukuoka Prefecture)

Facility_HCR	Collaboration rate #	Home care rate $
1. Fukuoka_Itoshima	5.1	7.1
2. Kasuya	2.6	5.7
3. Munakata	0.0	3.4
4. Chikushi	1.1	5.1
5. Asakura	0.0	2.2
6. Kurume	4.9	5.4
7. Yame_Chikugo	6.6	1.8
8. Ariake	2.2	7.0
9. Iizuka	5.0	3.0
10. Nogata_Kurate	3.3	5.5
11. Tagawa	1.4	2.9
12. Kitakyushu	3.8	5.0
13. Keichiku	0.0	7.4

Collaboration rate=Number of claims for collaboration/Total number of in-patient care claims
$ Home care rate = Number of patients with home care related claims/Total number of out-patients

al situation. This kind of analysis will ameliorate the practicability of RHCP.

One of the strength of the Japanese health system is the existence of claim data that has been developed in adapting the fee-for-service tariff schedule. Almost all medical facilities have computer system for claim data processing. Today more than 95% of medical claim are electronized. As explained in another article of this volume[6], in 2008, MHLW has started to construct the database of all claim data, so called the National Database (NDB). This database has been opened for research project and health policy making of local government. The current study was conducted to present the usability of NDB for the RHCP. The result of this study was already presented at the governmental committee and received a very positive evaluation. According to the result of this pilot study, we have applied the current methodology for claim data of all prefectures and developed the Excel based visualizing tool that creates figures and table as shown in Figure 2 to 5. This tool has been distributed to all prefectures and we have organized a series of seminars where we taught how to use the visualizing tool. It is determined that this visualizing tool is consecutively constructed annual base. This will contribute to realize the PDCA cycle based regional health policy making.

Note 1: The Japanese health insurance scheme composes of three public sub-systems. The National Health Insurance (NHI) scheme covers the self-employments and retired before 75 years old. The employees are covered by the society managed insurance scheme (SHI).

Note 2: In order to stabilize the finance for the aged care, MHLW has created the new insurance scheme that covers the population of 75 years old and more. The insurer is organized at the prefectural level. Fifty percent of cost is covered by tax, 40% by transfer from NHI and SHI, and the rest 10% by premium of the aged.

Note 3: For the poor people who are subject to the social assistance, the local government allocates a special financial support.

Note 4: DPC is the Japanese original patient classification system. It classifies each patient according to the combination of diagnosis and procedures. The base DPC corresponds to the major diagnosis. The number of base DPC is 512 in 2012 version.

❖Literatures

1) Kiyohide Fushimi and Shinya Matsuda: Application of Diagnosis Procedure Combination Case Mix System and National Patient Database to Regional Estimation of Disease Structure and Disease Management, APJDM: Vol. 1 (1), 2007: 29-33.

2) Shinya Matsuda: How do we promote the differentiation of hospital function in Japan? Social Insurance Quarterly (Syakai Hoken Junpo), No. 2429: 12-19, 2010. (in Japanese)

3) Shinya Matsuda: Amelioration of effectiveness of

Regional Health Care Plan using DPC data. Social Insurance Quarterly (Syakai Hoken Junpo), No. 2475: 16-23, 2011. (in Japanese)

4) Yuya Ogata: A discussion about the objective of Regional Health Care Plan and Regional Health Care Region, Hospital, Vol. 70(11): 822-826. (in Japanese)

5) Shinya Matsuda and Kenji Fujimori: Establishment of Regional Health Care Plan based on the DPC and claim data, Social Insurance Quarterly (Syakai Hoken Junpo), No. 2475: 16-23, 2011. (in Japanese)

6) Shinya Matsuda and Kenji Fujimori: The claim database in Japan, APJDM, Vol. 6 (1):, 2012.